Self-Efficacy and Teaching Effectiveness

Gail V. Barnes

University of South Carolina

Interpreting changing levels of self-efficacy while improving effective teaching behaviors can be one goal of teacher education programs. Undergraduate education majors often begin their teacher education programs with high levels of self-efficacy (a belief in one’s capabilities). These levels of self-efficacy frequently decline as pre-service teachers progress through their curriculum and make the transition to in-service teaching. A slight decline in these levels can be interpreted as a novice teacher’s greater understanding of the complexity of the teaching process.

Eighteen pre-service string teachers evaluated their levels of self-efficacy with the Teacher Efficacy Scale (Gusky and Passaro, 1994) three times during an academic year. The pre-service teachers were video taped three times during regular teaching assignments at a community music program. They self-evaluated the teaching episodes by the means of a Music Teaching Observation Form (Kelly, 1984). Experienced educators also evaluated the tapes.

Group and individual means indicated that ratings of teaching effectiveness by both pre-service teachers and experienced educators increased while levels of self-efficacy decreased slightly. Several specific items from the Teacher Efficacy Scale and Music Teaching Observation Form had significant changes. Changing levels in self-efficacy did not have an influence on increased teaching effectiveness scores for this specific group of pre-service teachers.

The ability of human beings to influence their environment is strongly linked with belief in their ability to bring about change. Albert Mandura, the social psychologist who devised the construct of self-efficacy, states, “People’s level of motivation, affective states, and actions are based more on what they believe than on what is objectively the case” (1991, p. 2). An individual with a high degree of self-efficacy makes judgments about his or her capacity to achieve a certain level of performance. A teacher’s sense of efficacy may influence their emotive state, their goal setting and their persistence (Ashton and Webb, 1986) since the complex nature of teaching
requires that an individual feel a personal power that transcends methodology (Vinson, 1994).

The roots of the teacher efficacy construct come from the 1976 and 1977 studies underwritten by the Rand foundation where sense of self-efficacy was reported to be “positively related to student achievement” (Denham & Michael, 1981). Two dimensions of the construct that relate to teaching are general teaching efficacy which is generally perceived as a belief in the power of teaching to achieve results in the classroom and personal teaching efficacy as one’s belief in one’s personal ability to achieve results. Teachers with high levels of self-efficacy have a strong academic and peoples orientation (Dembo & Gibson, 1985; Kinzie, 1991). Teachers with a high sense of efficacy feel a personal accomplishment, have high expectations for students, feel responsibility for student learning, have strategies for achieving objectives, a positive attitude about teaching and believe they can influence student learning (Ashton, 1984, p. 29). Teachers who perceive themselves efficacious will spend more time on student learning, support students in their goals and reinforce intrinsic motivation (Bandura, 1993, p. 140).

The literature on pre-service teacher and self-efficacy (Lanier, 1984; Narang, 1990; Walker, 1992) indicates that education majors often begin their university programs with very high level of self-efficacy. This may be because education majors enter their coursework having already spent much of their lives in classroom „in what is considered “apprenticeship of observation” (Lortie, 1975, p. 59). Narang (1990) believed that novice teachers have a positive belief in their teaching skills. Weinstein “stated that pre-service teachers may indeed have an unrealistic view, often bordering on overconfidence, about their ability to become effective teachers” (Wienstein, 1988, quoted in Walker, 1992).

There is evidence in the literature that these beliefs are not stable. Adams (1982) believed that as preservice teachers progress through their program, they became less concerned with self, but more concerned with external issues. Pigge and Marso (1990) found prospective teacher to be increasingly more concerned with their students as they develop a positive attitude about their effectiveness. Martin (1989) examined efficacy levels of novice teachers at various points in their education and concluded that efficacy beliefs begin early in teacher education programs. Housego (1992) found, through experience, a belief in one’s personal power can increase, while a belief in the power of teaching may decrease.
As a large percentage of current string teachers retire in the next fifteen years (Gillespie & Hamann, 1998), it is important that great numbers of young persons enter and remain in the profession. Understanding changes in efficacy levels along with young teachers’ evolving teaching skills may be one aspect of assisting them in making the transition to the classroom. One there, it is important they remain. For a teacher of string instrument, some of the situational demands include the challenged of building and maintaining a program and the need to develop community awareness about the value of having a orchestra program. Recruiting a large number of students is necessary to demonstrate the desire and need for a string program. Campaigning for an appropriate budget involves the ability to articulate the need and show a relationship to student learning (Culver, 1984; Gillespie, 1987; Gillespie, 1989a; Gillespie, 1989b). A teacher in a situation that poses the necessity to overcome these and other challenges requires a high degree of self-efficacy. “It requires a strong sense of efficacy to remain talk oriented in the face of pressing situational demands, failure, and setbacks that have significant personal and social repercussions” (Bandura, 1995, p.6). Those seeking a place in the profession need to develop effective teaching skills along with the disposition or desire to carry out these skills (Metz, 1986, p.54). Beginning to understand self-efficacy as it fluctuates with self evaluation and experience has many potential uses for both preservice and in-service teacher education and may be applied specifically to string teacher education.

The purpose of the study was to study preservice string teachers’ changing levels of self efficacy, self-evaluations of their teaching and evaluation of their teaching by experience string educators. It also sought to compare the relationship between preservice and experienced educators’ ratings of video taped teaching episodes and the relationship between self-efficacy and teaching effectiveness.

The four principal research questions were:

Method

Subjects

Subjects were eighteen undergraduate music majors at a southern university who were between twenty and twenty-one years old. The setting was an internship program that provides instruction in stringed instruments to community children while providing teaching experience to the university students. University students are selected for the program based on their entrance audition and interest in teaching.

The average length of teaching experience prior to the beginning of data collection was less than one semester. The script, which was read by graduate students prior to each administration of the Teacher Efficacy Scale, assured them the results of the study would have no influence on any other aspect of their teach education program. Summary results were made available to all subjects during the following academic year.

Preservice teachers were given the option of participating in the study. At the time of the study, there were twenty-five teachers in the community program. Five freshman assistants and two graduate students were eliminated form the subject pool due to the disparity in their experience and teaching situation. The remaining eighteen all elected to participate. Although eighteen subjects is admittedly a small sample size, a larger group would have been difficult to assemble. The university that sponsors that lab setting where the study took place has one of the largest available enrollment of undergraduate string education majors.

The preservice teachers have the opportunity to teach either private lessons, group classes, or both classes and lessons. Children enroll in the program during the fall and the majority range from age eight to age twelve. The class sizes consisted and between 11-15 students. Students are either first or second year string players and have a one hour class per week. The classes remained stable for the three data collection points (fall, winter, spring). Students have a half hour lesson each week. The average length of experience of the private students was 2.8 years. Parental involvement was required only to transport students to the lessons, as part of their participation in the intact program. The parents were aware of the study, but knew their children were not the principal focus.

If the preservice teacher taught both a class and lessons, tapes were
made of one example of both, and the preservice teacher had the opportunity to self-evaluate both experiences (total of twenty-five teaching episodes). This was considered appropriate since their perception of their teaching in both settings was hypothesized to affect their self-efficacy. Correlations between the data set of twenty-five episodes (one class and/or lesson from each preservice teacher) and from the set of eighteen episodes (one episode per teacher) were high ($r = .82$). When comparisons were made of the data from the Teacher Efficacy Scale and from the Music Teaching Observation Form, only one teaching episode was used (sixteen private lessons and 2 classes).

One study (Keraus, 1973) compares the performance of students in Suzuki group classes and students in private lessons and found that students performed at a similar level. Since there were no available data on the differences in novice teaching of group and private lessons, experience educators who also viewed and evaluated the video tapes were consulted about possible difference between the teaching behaviors between private lessons and classes. Their opinion was that although the behavior of students may differ in a group setting, the teaching behaviors at this novice level were not noticeably different.

**Measurement of Teacher Efficacy**

The Music Teaching Observation Form was adapted from the instrument developed by Sung (1982) who examined the professional literature for the teaching behaviors most associated with classroom effectiveness appropriate to field experiences at the sophomore level. Sung utilized items from Doane (1981) who compiled a list of competencies that can be expected for preservice teachers in early field experiences. Sung asked experienced teacher-educators to review items for “degree of importance, appropriateness of operational definitions, accessibility, importance at sophomore level” (1982). Kelly (1984) used the form developed by Sung, but adapted it for peer teaching situations. In the Kelly study, the final form was given to three music teacher educators who agreed on its appropriateness for preservice teachers. The version used in the current study was adapted from the version by Kelly.

The Music Teaching Observation Form was submitted both to an experienced teacher educator an experienced school orchestra director for review. They suggested some minor wording changes. In addition, since persistence and high student awareness are characteristics found in teachers with a high degree of self-efficacy (Bandura, 1982; Ashton, 1984), the following items were added: “Persists when student(s) have
difficulty with concept” and “Monitors student learning.” In preparation for self-evaluation of videotapes, preservice teachers practiced using the Music Teaching Observation Form. Sample teaching episodes of an experienced teacher and a graduate student were viewed and after marking the form, various points raised by the preservice teachers were discussed.

Procedures

At the conclusion of the study, the preservice teachers had evaluated their self-efficacy three times (fall, winter, spring). In addition, preservice teachers were videotaped in both classes and lessons three times during two academic semesters (fall, winter, spring). Taped episodes were fifteen minutes long. Preservice teacher viewed the tapes and rated themselves in varying degrees of effectiveness on a 6 point Likert-type scale.

Three experience educators were asked to view the tapes at the conclusion of videotaping and preservice teachers’ self-assessments. This was intended as a check on the accuracy of the preservice teachers’ self-evaluations and as another measure of changing levels of teaching effectiveness. The three educators had an average of seventeen years teaching experience in elementary, middle school, and high school orchestra programs. They were recommended by colleagues in both the public school and university communities for providing a consistently high standard of stringed instrument instruction.

The experience educators were trained in the use of the instrument with the same tapes that were used for training the preservice teachers. After the training session, then overall agreement was moderately high ($r = .79$). Operational definitions were devised by the principal investigator, an experience teacher educator and experience school educator. For the following items, operational definitions from Hamann and Baker (1996) were utilized:

7. Keeps an effective lesson pace Minimizes time between events, makes smooth transitions

13. Supports and encourages the best efforts of students *Maintains a positive tone in the class/lesson*

18. Controls and varies speech speed *The speech speed is not static*

The tapes were color-coded and distributed in random order so the
experienced educators would not be aware of the order. At the conclusion of viewing the three sets of videotapes from fall, winter, and spring, agreement was raised to .89 (SD = .04).

Analysis

Due to the small sample size, a test of marginal homogeneity was conducted (Agresti, 1990) for specific and item-by-item analysis of both self-efficacy and teaching effectiveness. Testing of all six points of the Likert-type data was rejected because there were not sufficient data to test hypotheses of interest. Crosstabulations were calculated to give frequency counts of the number of times a rating was given for a specific item.

Crosstabulations were calculated for:

• The three measures (fall, winter, spring) of the university students’ self-efficacy

• The three measures (fall, winter, spring) of the preservice teachers’ self-evaluation, or judgments of their teaching effectiveness

• The three measures (fall, winter, spring) of the experienced educators’ evaluations of the preservice teachers

• The comparison of the preservice teachers’ self-evaluation and the experienced educators’ evaluations of the same teaching episodes for the three periods of time (fall, winter, spring).

Frequency patterns in these calculations helped determine that Likert data could be recoded as binary variables. Data from the Teacher Efficacy Scale were recoded so that a rating of 1-3 (degrees of ‘disagree’) was a ‘1’ and a rating of 4-6 (degrees of ‘agree’) was a ‘2’. Reporting of the binary data from the Teacher Efficacy Scale represented the original Likert data in that it equated the marginal proportion with the number of preservice teachers that indicated 3’3 or less on the survey form.

The Music Teaching Observation Form allowed preservice teachers and experienced educators to assess specific teaching behaviors with a Likert scale where 1 was ‘not effective’ and 6 was ‘highly effective’. The data were converted so that 1-4 was a ‘1’ and 5-6 was a ‘2’. This was due to an observed generosity error (Gay, 1996) from both preservice teachers and experienced educators. The reporting of the binary data represented the original Likert data, or in other words, the
marginal proportion indicated the percentage of preservice teachers that were assigned a ‘four’ or less on the Music Teaching Observation Form. SAS analysis of the binary data used marginal probabilities to produce a response function and level of significance.

Results

<table>
<thead>
<tr>
<th>Table 1 Comparison of Self-Efficacy and Teaching Effectiveness</th>
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<tr>
<td><strong>Variable</strong></td>
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<tr>
<td>Self-Efficacy</td>
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<td>Teaching Effectiveness/Preservice Teachers</td>
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<td>Teaching Effectiveness/Experienced Educators</td>
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The data indicated the percentage of preservice teachers who agreed with statements on the Teacher Efficacy Scale. Mean data indicated that overall levels of self-efficacy declined during the study. On the item analysis of the Teacher Efficacy Scale, two of the twenty-one items (9 and 15) had significant results for change (p < .05).

Trends in the data may indicate that preservice teachers became somewhat less efficacious in areas of personal control. Although many results were not statistically significant, the descriptive data indicate that in six out of ten items that evaluated the preservice teachers’ feeling of personal control in a classroom (2, 5, 7, 9, 14, 16), teachers had declining levels of efficacy. In either winter or spring, preservice teachers rated eight out of eleven items related to power of teaching (1, 4, 10, 11, 12, 15, 20) with increased levels of efficaciousness. Preservice teachers appeared to be more uncertain of their personal power, particularly in areas affected by the home environment, but
were still convinced about the power of teaching. The data from items that related to persistence (1, 8, 19) remained stable and high throughout the study.

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>Ratings of Teacher Efficacy (Teacher Efficacy Scale)</th>
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<tbody>
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<td>(fall)</td>
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<td>1</td>
<td>.83(a)</td>
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<td>2</td>
<td>.22</td>
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<td>3</td>
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</table>

\(a\) Percentage of preservice teachers that indicated 4, 5 or 6 (varying degrees of agreement) on a Likert scale

* \(p \leq .05\)

\(b\) p, i, t, e indicate personal-internal, teaching-internal, personal-external, teaching-external
#2 Do ratings of teaching effectiveness change with teaching experience?

The data yielded indicated the percentage of preservice teachers and experienced educators who agreed with the specific statements on the Music Teaching Observation Form. Mean data indicated self-ratings of teaching effectiveness increased. Means of the summed data from the experienced educators indicated ratings of teaching effectiveness increased (see Table 1 above). In the item-by-item analysis of data from the preservice teachers, there were significant ratings (p < .05) for improved effectiveness (from fall to spring) on five out of twenty-one items. Experienced educators indicated significant ratings for improved effectiveness in six items.

![Graph showing ratings of teaching over time](image)

**Figure 1.**

Trends in the other items indicated preservice teachers rated themselves as more effective at the end of an academic year. Ratings by experienced educators indicate evidence of improvement, particularly in those items that had a significant change.
#3 Is there a relationship between preservice teachers' and experienced educators' ratings of the same teaching episodes?

There were no significant differences in marginal proportions from the item-by-item analysis in 75% of the responses comparing preservice teachers' and experienced educators' rating of the teaching episode. Indications are that preservice teachers and experienced educators of the same teaching episodes yield parallel results. There was a correlation between preservice teachers' self-ratings and ratings of
experienced educators in the fall ($r = .48$). The winter and spring rating were not significantly correlated.

#4 Is there a relationship between ratings of self-efficacy and ratings of teaching effectiveness?

There was a correlation between preservice teachers’ self-ratings and self-efficacy for the winter ($r = .48$) and spring assessments ($r = .68$). Fall ratings were not significantly correlated. With self-evaluation and teaching experience, preservice teachers’ self-ratings of teaching effectiveness and their ratings of self-efficacy became closely associated.

There was a correlation between ratings of experienced educators and self-efficacy of preservice teachers in the fall ($r = .55$). Rating for winter and spring were not significantly correlated. The summed data (Table 1 above) gives an indication that overall ratings by experienced educators were higher than those of the preservice teachers as the study progressed. Figure 2 provides an illustration of the mean data at the conclusion of the study.

![Figure 2. Self-efficacy, Self-evaluation and Evaluations of Experienced Educators](image-url)
Discussion

One of the items that had a significant change in the Teachers Efficacy Scale was: “I am very limited in what I can achieve because a student’s home environment is a large influence on his/her achievement.” Even though generalizability is limited because of the small sample size, implications were that after two semesters of teaching experience, more preservice teachers believed they were somewhat limited in their personal power over the home environment than did at the beginning of the study. The other item that demonstrated significance was “The influence of a student’s home experiences can be overcome by good music instruction.” At the final administration of the Teacher Efficacy Scale (spring), more preservice teachers agreed with the statement or believed the influences of students’ home experiences can be overcome with good music instruction.

Although these two items appeared to be in conflict, indications were preservice teachers were changing their views about their personal efficacy and their teaching efficacy. Item #9 evaluated the personal-external dimension of self-efficacy. Item #15 was intentionally worded by Gusky & Passaro (1994) to evaluate the teaching-internal dimension of self-efficacy. The results seem to imply that preservice teachers’ belief in the influence of teaching was higher while their belief in their personal influence was somewhat diminished. One interpretation could be that these preservice teachers were becoming more realistic about what can be controlled through music instruction. The videotapes provided a visual example of their actual (versus perceived) teaching performance and may have had an effect on levels of efficacy. Persistence, which remained stable throughout the study, may be one reason why ratings of teaching improved during the length of the study, even though the preservice teachers became less confident, or perhaps more realistic in their personal beliefs.

Pearson correlation coefficients were significant between preservice teachers’ and the three experienced educators’ ratings for the teaching episodes for the fall. The summed values provided evidence of preservice teachers having rated themselves less favorably throughout the study than the experienced educators, but the differences were greater in the winter and spring. In an examination of non-significant trends, there was an average difference of only eight percentage points between the preservice teachers and the experienced educators. Items that were more positively rated by the experienced educators were associated with behaviors that may more readily
change with teaching experience, including monitoring student learning, allocating time, effective pace, modulating voice and speaks clearly and understandably. Some items that were related less favorably may require more than two semesters of experience to master such as incorporating musicianship, enthusiasm, and a sense of humor. These would be expected once a higher degree of comfort with basic teaching skills is acquired and preservice teacher may more accurately rate those particular behaviors with more experience. Future research with a larger sample size may yield significant results for more items on this instrument.

Findings of the current study are consistent with previous writing in teacher efficacy. Teachers learn to make realistic judgments about their effectiveness in certain contexts (Guskey, 1994) and preservice teachers do have fluctuations in efficacy as a result of their preservice experiences (Kushner, 1993). However, findings of this study are somewhat different than Housego (1992) who found new teachers gained confidence in their personal power, but their belief in the power of teaching was diminished. Denham & Michael (1981) stated the five antecedents to teacher efficacy were teacher education, teacher experience, system variables, personal variables and causal attributions. The current study was able to study efficacy beliefs in comparison to only one of these antecedents, teacher experience.

Implications

Slightly declining levels of self-efficacy do not appear to have an effect on preservice teachers’ improved levels of teaching effectiveness. The lower levels could be interpreted as a correction in initially inflated levels of self-efficacy. If preservice teachers are aware of which elements of student achievement can be improved through good teaching and which are the domain of the home environment, they may be more realistic in their goal setting and less inclined to become discouraged when in a school setting. However, they should be encouraged to strive for excellence in teaching in spite of the frustrations they may encounter.

The use of videotape with a behavior checklist is an effective method of teacher education. Preservice teachers improved in their teaching skills after self-observation and practice. This is well documented in the music education literature (Price, 1993; Cassidy, 1993; Colwell, 1998). Music teacher education programs should incorporate self-assessment (videotape and behavioral checklists) for preservice teachers.
The quality of persistence could be related to improvement in ratings of teaching effectiveness and items relating to persistence remained high and stable for the duration of the study. Indications were preservice teachers had a conviction that their “teacher training program and/or experience” had given them “the necessary skills to be an effective teacher.” This could be an indication that settings that provide young teachers with an opportunity to have teaching experience are worthwhile addition to a teacher education program. If, during their teacher education program, preservice teachers can participate in a young person’s musical education, the intrinsic rewards of teaching may sustain them through the temporary doubts they may encounter. It may also assist them in the situations they will encounter as a string teacher in school settings: building and maintaining a program, developing community awareness, recruitment along with all of the musical rewards and challenges.

Further Research

In addition to replication within a larger sample, it would be desirable to study self-efficacy in preservice and inservice teachers and its relationship with observed levels in their students achievement. Previous studies (Walker, 1992) have shown student achievement and self-efficacy to be related. Studying changing levels of student achievement along with changing levels of efficacy might be one step in answering the question of which comes first.

Another useful study would be to assess levels of efficacy of the preservice teachers in the current study after some experience in a public school setting. Some previous studies have shown that practicing teachers are less concerned with self and more concerned with parents, students and administrators. The preservice teachers in this investigation maintained their persistence and belief in the power of teaching throughout the study. It would be useful to determine if these beliefs would remain stable through experience in a school music classroom.
References


